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KEWA

NEWSLETTER OF THE LONDON CHAPTER, ONTARIO ARCHAEOLOGICAL SOCIETY

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LONDON CHAPTER OAS

November 2002 02-7

CHRISTMAS PARTY TIME HAS ARRIVED!! DETAILS INSIDE

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The January speaker will be announced in the December issue of **KEWA**. February will be the traditional members' night with several brief 10 to 15 minute presentations. Chris Ellis and Holly Martelle have already agreed to do presentations, but additonal presenters are needed. If you are willing to do a presentation, and remember we are desperate, please contact Chris Ellis.

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Remember the Christmas Party replaces the December meeting. The January meeting, as always, will be held at 8 pm at the London Museum of Archaeology, 1600 Attawandaron Road, near the corner of Wonderland & Fanshawe Park Road, in the northwest part of the city.

ANNUAL RATES

Individual...............	$18.00
Student..................	$15.00
Institutional............	$21.00
Subscriber.............	$20.00

OCCASIONAL PUBLICATIONS OF THE LONDON CHAPTER, ONTARIO ARCHAEOLOGICAL SOCIETY

The Occasional Publication Series of the London Chapter, OAS is devoted to publishing full-length manuscripts on the archaeology of northeastern North America and related topics. This award-winning series features manuscripts reporting on important site excavations in the region, as well as major cultural-historical syntheses. The following manuscripts are available as of November 1, 2002:

#3 - ***The Adder Orchard Site: Lithic Technology and Spatial Organization in the Broadpoint Late Archaic*** (1997 - 7 Chapters: 100+pp, 30+ figures), Jacqueline Fisher
Cost: ~~$15.00~~ **Sale Price: $10.00**

#4- ***Deeds/Nations*** (a comprehensive directory of 18th and 19th century Native leaders and major personalities from southwestern Ontario and southeastern Michigan).
(1996 - 200+pp, 90+ figures, including totems and artwork), Greg Curnoe
Cost: ~~$22.00~~ **Sale Price: $17.00**

#5- ***The Archaeology of Southern Ontario to AD 1650*** (available as a CD only, text out of print) Chris Ellis & Neal Ferris, editors (1990 - 16 Chapters: 550+pp, 210+ figures; Requirements: 386, 486 or Pentium Computer, 8 megs Ram, 2x CD-Rom Drive, Windows 3.*/95/98/etc., SVGA preferred @ 24 bit). Order the CD directly from: Adams Heritage Consultants through their web page: http://adamsheritage.com/index.htm ; or by e-mail at nickadam@rideau.net
Cost: $37.50 (includes PST/GST S/H) or US $29.50

#7 ***The Myers Road Site - Archaeology of the Early to Middle Iroquoian Transition***
(1998 - 6 Chapters: 210+ pp, 75 figures) Ron Williamson, editor
Cost: $18.00 **Sale Price: $13.00**

#8 ****NEW* Excavations at the Caradoc Site – A Late Paleo-Indian Ritual Artifact Deposit***
(2002 – 6 Chapters: 180+ pp, 62 figures) Christopher Ellis & D. Brian Deller
Cost: $15.00

Occasional Publication Series volume orders can be sent to the London Chapter. When ordering, money orders and cheques should be made out to the London Chapter, OAS. Please add $5.00 for postage and handling. **PLEASE NOTE AMERICAN ORDER EXCHANGE RATE: 20%.** Please address orders and direct inquires to:

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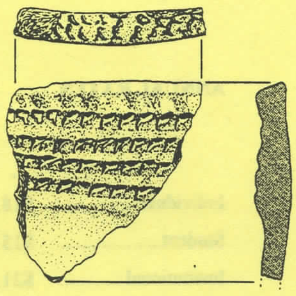

London Chapter News

A good time was had by all at our Fall meetings of 2002 featuring three very divergent speakers and topics. In September, Dr. Gary Warrick of Wilfred Laurier University provided an excellent overview of his research on historic Mohawk sites near Brantford while in October Brooke Milne, who is completing her PhD research at McMaster took us farther afield to the eastern Arctic with her thought-provoking discussions of the causes of stone artifact variability on Paleo-Eskimo sites on Baffin Island. In November we went even farther afield with a trip to West Africa (Mali) with Jerimy (Jay) Cunningham of McGill University who enlightened us on some aspects of his ongoing ethnoarchaeology PhD research with ceramics.

We have managed to keep close to the planned Kewa production schedule this year and we profusely thank those individuals who provide us with research articles – but as always, we eagerly solicit contributions from one and all. Kewa production costs have remained quite steady over the past few years at about $225.00 to produce and mail each issue and we have managed to keep the costs in check by shortening a bit the size of our issues. Financially, and taking into account our costs to rent the Museum for our meetings, take speakers out to dinner, and pay refreshment costs as well, our current membership fees plus profits on our book sales allow us to break even and we hope to maintain this in the future.

Our Occasional Publication series books continue to sell but are on the decline largely because we have not released any new books in the last four years or so. However, one new publication will be released very shortly by Chris Ellis and Brian Deller (with a contribution by R. H. King) entitled: Excavations at the Caradoc Site (AfHj-104): A Late Paleoindian Ritual Artifact Deposit and we are accepting advance orders. This release will be No. 8 in the Occasional Publications series, is just under 200 pages in length and costs $15.00 (+ $5.00 for mail orders) which is very cheap in today's book market – see current publication list in this issue for details. Neal Ferris, our publication series editor, has other volumes in the works. We have a healthy bank balance in our publications account which would allow us to produce more than one volume.

Other than our meetings and publications, not much has happened on the London Chapter front. The chapter has not hosted the annual meeting of the OAS for some time – the last time was when we ran the meeting in Niagara Falls in 1993. We have agreed however, to consider hosting the annual meeting in London in the Fall of 2004 and any feed back on what members think of this would be appreciated by the Executive. Speaking of the Executive, it is getting near the end of the year and it is time for people to start thinking about whether or not they would like to serve on the executive next year. Anyone who would, or even if you would just like to nominate someone, should contact the Chair of the nomination committee, Christine Dodd, at the phone number/email address on the cover. The results are usually announced at the Annual Christmas party which will be held by Chris Ellis (his arm twisted by Paul O' Neal) at his condo (515-1510 Richmond St. N., London), beginning at 7:30 P.M. on Saturday, December 7, 2002 (call 858-9852 for details/directions). Soft drinks and some snacks will be provided -- BYOB.

Osteological Analysis of Human Remains:
Horseshoe Valley Road, Oro-Medonte Township, Simcoe, Ontario

Adriana Mandich

Introduction

This article summarizes the osteological analysis of a small ossuary, discovered in Oro-Medonte Township. The ossuary contained only skeletal material unassociated with any artifacts. It is speculated that the ossuary is prehistoric Huron. The ossuary contained 11 individuals, which were commingled and disarticulated. Individualization was accomplished mainly due to the extensive age range, which included four adults, three infants, three children and one older adolescent. Osteological analysis included age-at-death, stature, racial affiliation, sex determination, and analysis of both pathological and genetic conditions. Though small, the sample is valuable in that the great span in age-at-death can provide important representative information about the greater population at large. Upon completion of this study, the skeletal material was reburied in concordance with predetermined arrangements.

Background

During road construction work, in July 2001, a mass grave of eleven commingled, fragmentary and disarticulated individuals, was discovered off of Horseshoe Valley road, in Oro-Medonte township, Simcoe county (Figure 1). Previous excavations in the township had revealed multiple "bone pits" which were commonly associated with nearby single graves (Hunter 1902). Excavation around this particular mass grave yielded no additional signs of other closely associated burials (Ball 2001).

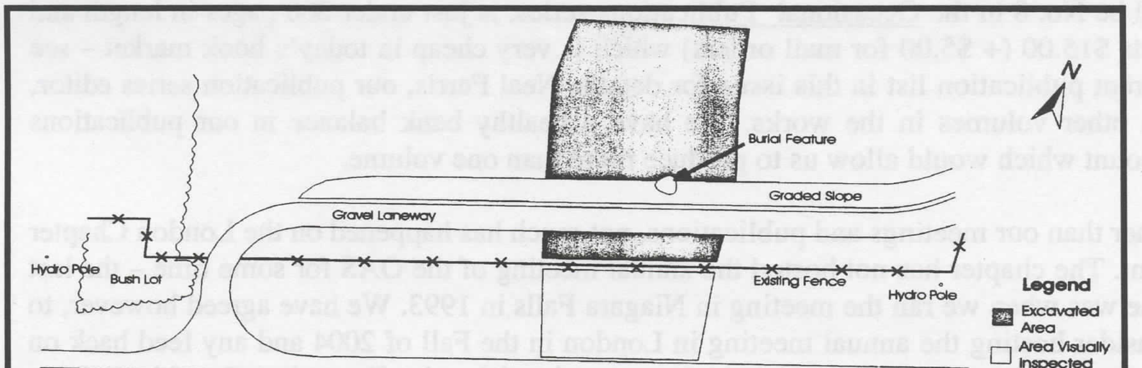

Figure 1: Detail of Study Area (J.Haxell in Ball 2001)

The mass grave contained no artifacts. The lack of artifacts and the lack of funding to undergo radiocarbon dating, meant that it was not feasible to obtain a precise date of

burial. A prehistoric date for the grave is suggested based on the style of burial and location found (Ball 2001; Hunter 1902). During the prehistoric period, the area was occupied by Hurons, who are known for their unique ossuary burial practice. Though this mass grave is much smaller than the typical Huron ossuary, its presence can be placed within the possible context of the Huron ossuary practice.

Historical Background - The Iroquoian Ossuary

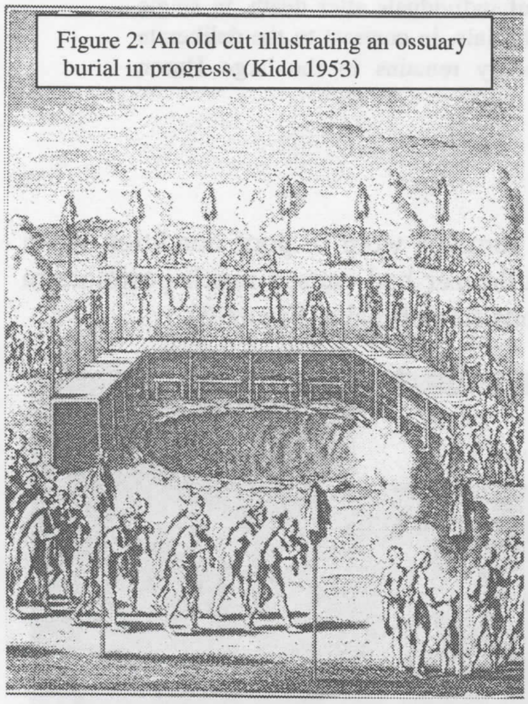

Figure 2: An old cut illustrating an ossuary burial in progress. (Kidd 1953)

The Iroquoian ossuary is a well-known burial practice in Ontario. Johnston (1979) defines a Southern Ontario Iroquoian ossuary as a pit containing the secondary remains of a minimum of 10 or 12 individuals. Most documented ossuaries contain hundreds of individuals, as exemplified by the site of Ossossane from the Historic period Ossossane is more elaborate than a Prehistoric ossuary would have been. It contained numerous artifacts of fine quality, while prehistoric ossuaries, like the one studied here, tended to only contain skeletal remains (Johnston 1979) (Figure 2).

Jean de Brebeuf, a Jesuit priest witnessed and described the ossuary ceremony at Ossossane, from the year 1636. Following is a summary of his first hand account:

> "The ceremony associated with an ossuary is known as the Feast of the Dead. The Feast of the Dead is a ritual feast that occurs in each village as the human remains since the last ceremony (every 10-12 years) are taken from their cemeteries to the communal burial pit of several villages (the Nation). Those bodies that are still undergoing putrefaction are stripped of any remaining flesh and clothing. Individuals who had recently died are left as they are, except for the addition of new beaver pelt robes. The articulated bodies were taken to the ceremony on a litter while the disarticulated and defleshed bones were bundled in a bag or wrapped in beaver skins. The ceremony involves several days of preparatory feasting, gift giving and entertaining in memoriam of the dead, as everyone waits for representatives from all the villages to arrive.
>
> The ceremony centers on a large pit (e.g. 10 feet deep at Ossossane), which has a large scaffolding around it (e.g. 9-10 feet high at Ossossane) (Figure 4). The articulated whole skeletons were laid out around the pit perimeter, while the bundles of bones with gifts were hung from the scaffolding. In the evening, the pit is lined with fine beaver skin robes. The whole bodies are first laid out carefully in the bottom of the pit with three large kettles. The remaining bundle burials are then placed in the pit. All of it was then covered with more mats, bark, sand, wooden poles, wooden stakes and corncobs. (Thwaites 1897:289-291) (Fenton and Kurath 1951:139-165).

Most of the Iroquoian ossuaries were pillaged for curiosity or their artifactual remains in the early 19th century when settlers were clearing the land (Kidd 1953). In the last half century, several ossuaries were discovered nearby, carefully excavated and the human

remains were analyzed (Anderson 1963; Johnston 1979; Kidd 1953; Pfeiffer 1983). Johnston in 1979 noted that over 216 Iroquoian ossuary sites were then known.

Two of the major Iroquoian groups at contact, were the Huron and the Neutrals. Johnston (1979:96) has noted some distinction between Huron and Neutral Ossuaries. Excavation at Neutral sites has indicated that they seem to have placed:

> greater importance on maintaining the integrity of individuals after death, in single flexed burials or in carefully arranged multiple burials, in contrast to the deliberate mixing of large numbers of incomplete secondary remains in the large Huron ossuaries.

Methodology

Due to the nature of their discovery, the skeletal remains were in poor condition when handed over for osteological examination. The bulldozer had caused much postmortem fragmentation, as could be observed by the numerous fresh breaks (Figure 3).

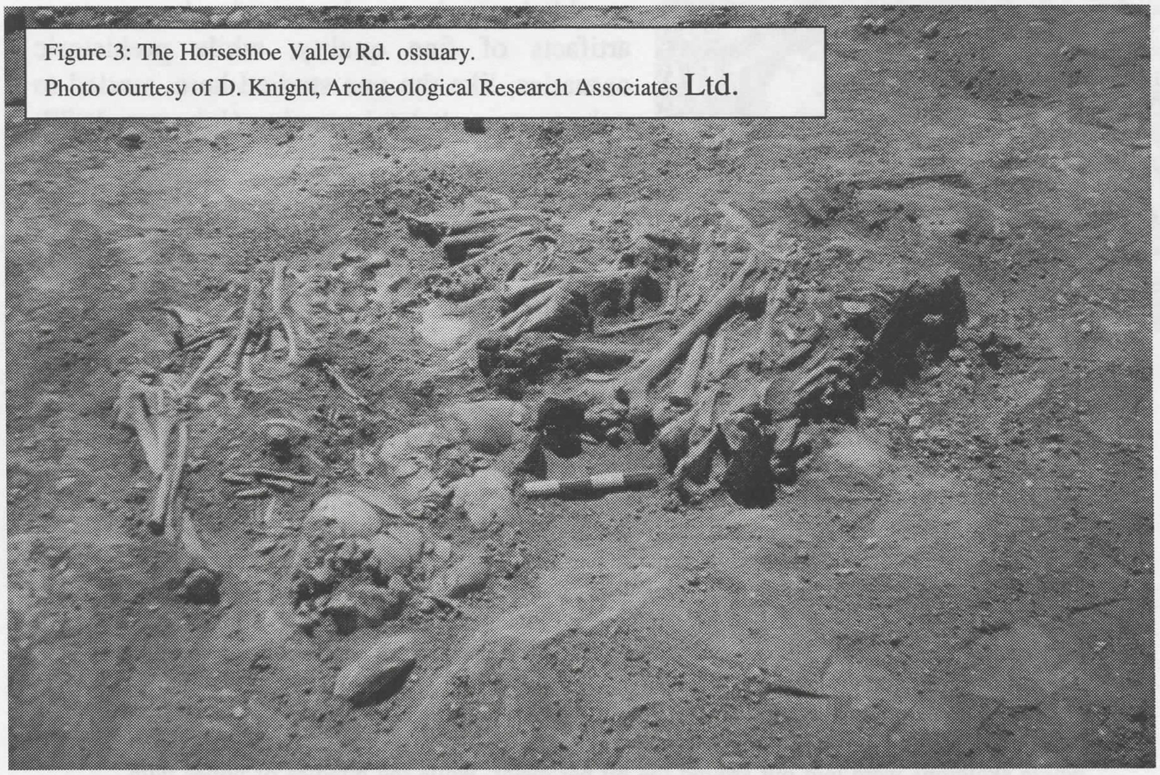

Figure 3: The Horseshoe Valley Rd. ossuary.
Photo courtesy of D. Knight, Archaeological Research Associates Ltd.

Taphonomy, the study of postmortem burial changes had a direct impact on the osteological analysis. Taphonomic processes range from soil pressure, water damage, animal scavenging, human or mechanical interaction (e.g. a farmer's plow), root growth and diagenesis, to cryoturbation through ice. All of these processes can cause weathering, cracking, flaking, shrinkage, staining, abrasion and warping of the bone. Pits, punctures or teeth marks result from animal scavenging; while plant roots can leave impressions on the bone surface, which resemble a network of blood veins.

The skeletal population under study in this report was not immune to taphonomic processes. Almost universal fragmentation of the remains occurred as a result of the bulldozer. Regrettably, the bones that suffered the greatest damage were the crania. Almost all the crania were located in a corner of the burial, near the surface. Second only to human interaction, the surrounding soils and natural weathering processes of the environment had a significant impact on these bones. The thin sub-adult skulls were extensively fragmented, brittle and warped. The consequence of this poor preservation was the inability to reconstruct almost all of the crania. The most intact skull could not be reconstructed facially below the surpaorbital ridge.

The few remains that were found articulated were noted and kept separated from the disarticulated remains. The remaining fragments were first sorted by individual bone, and then by side. Once the bones were washed, reconstruction of individual elements was undertaken. Approximately 75% of the fragments could be identified *and* reconstructed into complete bones.

Careful reconstruction resulted in the identification of a minimum number of individuals (MNI) of 11. The MNI was based on several skeletal elements including the mandible, the right humerus, the left innominate and the left femur. The total number of individual bone elements with the exception of vertebrae, ribs and teeth are summarized in Table 1.

Individual bones and partially articulated skeletons were then both examined to determine values for age-at-death, sex, stature and ethnic affiliation. Each individual bone was also examined for any evidence of pathology. Of the 11 individuals, only four are adults. Three are young infants (birth - 3 years), three are children (3 - 13 years) and one is an older adolescent (16 - 20 years). It was possible to reconstruct individuals to varying degrees from the disarticulated remains, in large part because of the great age-at-death ranges (from young infants to old adults). Pathological conditions, sex, and articulation surfaces were also utilized to further reconstruct individual skeletons.

The greatest sexual dimorphism can be found in the pelvis after an individual reaches puberty. Using a complete pelvis, an experienced human osteologist can correctly sex a skeleton over 95% of the time. The skull can also be examined to identify the sex of an individual. Sex determination using the skull alone has been estimated to have accuracy in the area of 80% for an experienced osteologist. Biological sex was established for the adult skeletons of this sample through non-metric examination of the pelvis. The pelvis was examined because at least one innominate bone was present for each individual. Sex was also determined for the single adult skull that was partially intact. Non-metric analysis of the os coxae was carried out as established by Buikstra et al. (1994) and Phenice (1969). Non-metric sex determination of the skull was carried out as described by Buikstra et al. (1994). Metric analysis of the long bones (i.e. robusticity) was also used to supplement the sex determination of the adult skeletons when possible.

Biological sex of the sub-adults was not established. While it is presumed that sexual dimorphism does exist from an early age in the human skeleton, it is thus far also believed that it does not reach a sufficiently high level of difference, to allow reliable

discrimination of sex, until puberty has sufficiently altered the skeleton. Though numerous studies have attempted to establish a highly accurate and repeatable method for sexing infants, they have not been very successful, nor wholeheartedly accepted by the academic community (Boucher 1957; Henneberg 2001; Hunt 1990; Mittler and Sheridan 1992; Schutkowski 1993; Weaver 1980).

Age-at-death for adults was established by analyzing the appearance of the pubic symphysis as described by Todd (1921) as well as Brooks and Suchey (1990). This was done in conjunction with the age estimates on the auricular surface of the os coxae as described by Lovejoy et al. (1985). Age was not calculated based on suture closure, due to the extensive fragmentation of all skulls except for one, and the unreliability of suture analysis in age determination (Hershkovitz et al. 1997).

For the sub-adults, age-at-death was determined from diaphyseal measurements (Anderson 1964; Maresh 1970), as well as tooth eruption as described by Ubelaker (1989).

Stature estimations for the adult skeletons had to be made from long bone measurements, because the remains were disarticulated and commingled. Stature was not assessed for the sub-adults due to the lack of adequate formulae. Stature varies by ethnicity and sex, thus different equations must be used depending upon these particular features. The most accurate stature estimations are made when the lower limb bones are used. Regrettably, unlike for white and black males, there are no stature formulae developed solely from Native American remains. The formula for male mongoloids developed by Trotter (1970) provided the best available estimate of stature for Native Americans. Since the stature formula only exists for males, Byers (2002:242) recommends that it be multiplied by 0.92 for females.

The greatest amount of information regarding ethnic affiliation is found in the facial features. While long bone measurements can provide an indication of ethnicity, they are not as accurate or reliable. The ethnic affiliation of this population as Native American rests on three elements two osteological and one contextual. To begin, several shovel shaped incisors were found which are known to be a Native American dental trait (Byers 2002:161). Secondly, the extreme dental wear is common to an archaeological population which would include prehistoric Native Americans, who ate food which often unintentionally contained gritty inclusions. Lastly, the type of burial itself is reminiscent of the multiple burials associated with Prehistoric Hurons.

Osteological Analysis:

Table 1 (all tables are at the end of the paper) summarizes the total number of distinct whole or fragmented bones that were reconstructed. As noted above, from these values a minimum number of individuals (MNI) of 11 could be determined. Table 2 is a bone inventory for each adult individual. Assignment to individuals was made by examining the age-at-death values, sex, articulation surfaces, measurements and pathologies for individual bones. Table 3 is a similar inventory for the sub-adult individuals. Table 4 is a

summary of the bone measurements for the adult individuals, while Table 5 is a similar summary for the sub-adults. Measurements were taken according to the standardized system explained by Buikstra et al (1994) and Bass (1995). A summary table of the osteological analysis *per individual* (i.e. sex, age, stature and pathological conditions) is provided in Table 6.

Table 1: Minimum Number of Individuals Based on Individual Bone Counts:

Bone	Side	Minimum No.
Skull:		
Temporal Bone	left	8
	right	9
Pars basilaris	NA	4
Pars lateralis	left	3
	right	4
Mandible	NA	11
Post Cranial:		
Clavicle	left	6
	right	8
Scapula	left	9
	right	7
Sternum	NA	3
Humerus	left	10
	right	11
Radius	left	9
	right	7
Ulna	left	9
	right	9
Sacrum	NA	6
Innominate	left	11
	right	9
Femur	left	11
	right	10
Patella	left	5
	right	6
Tibia	left	8
	right	7
Fibula	left	8
	right	7
Hamate	left	5
	right	4
Lunate	left	5
	right	4
Navicular	left	4
	right	2
Lesser Multangular	left	3
	right	3
Greater Multangular	left	5
	right	3
Triqueteral	left	5
	right	5
Capitate	left	5
	right	2
Pisiform	left	2
	right	2

Bone	Side	Minimum No.
Metacarpal #1	left	5
	right	4
Metacarpal #2	left	4
	right	4
Metacarpal #3	left	5
	right	4
Metacarpal #4	left	3
	right	3
Metacarpal #5	left	4
	right	5
Talus	left	8
	right	5
Calcaneus	left	8
	right	6
Cuboid	left	5
	right	4
1st Cuneiform	left	6
	right	6
2nd Cuneiform	left	6
	right	6
3rd Cuneiform	left	5
	right	4
Navicular	left	5
	right	4
Metatarsal #1	left	8
	right	6
Metatarsal #2	left	4
	right	5
Metatarsal #3	left	5
	right	5
Metatarsal #4	left	5
	right	5
Metatarsal #5	left	5
	right	6

	Row	Minimum No.
Carpal Phalanges	Proximal	34
	Intermediate	82
	Distal	52
Tarsal Phalanges	Proximal	18
	Intermediate	23
	Distal	69

NA – Not Applicable
The temporal bone includes the External auditory meatus, the mastoid process and/or the temporal extension of the zygomatic process.

Table 2: Bone Inventory of Reconstructed Adult Individuals

Bone	Side	Individual 1	Individual 2	Individual 3	Individual 4
Clavicle	left	(P)	(P)	P	-
	right	(P)	(P)	P	-
Scapula	left		-	-	-
	right	-	-	(P)	-
Patella	left	-	P	P	-
	right	P	P	P	P
Sacrum	NA	P	P	P	
Innominate	left	P	P	P	P
	right	P	P	P	-
Sternum- manubrium	NA	P	-	(P)	-
Sternum - body	NA	P	-	(P)	-
Humerus	left	P	P	P	P
	right	P	P	P	P
Radius	left	P	P	P	P
	right	-	P	P	P
Ulna	left	P	P	P	P
	right	-	P	P	P
Femur	left	P	P	P	P
	right	P	P	P	P
Tibia	left	-	P	-	-
	right	-	P	P	-
Fibula	left	-	P	-	-
	right	-	P	-	-
Vertebrae - Cervical	NA	-	-	C1-C7	-
Vertebrae - Thoracic	NA	T1-T12	T12	T1,T2,T12	-
Vertebrae - Lumbar	NA	L1-L5	L1-L5	L1-L5	-
Cranium	NA	-	-	P	-
Mandible	NA	-	-	P	-

P = Present; – = Absent; (P) = Less reliable reconstruction; N/A = Not Applicable

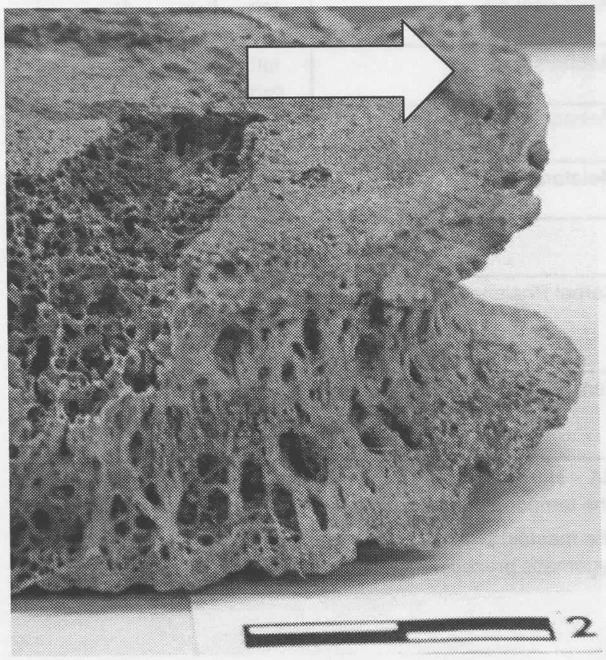

Figure 4: Close-up of osteophytic lipping on LV5, individual 2, ventral view.

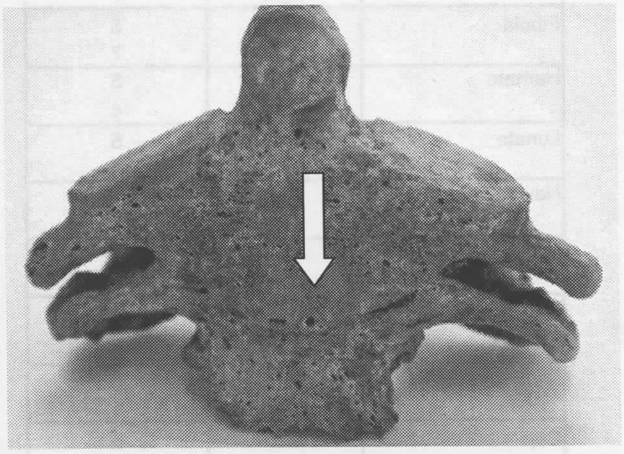

Figure 5: Osseous ankylosis of CV2 and CV3, individual 3.

Table 3: Bone Inventory of Sub-Adult Individuals

Individual:		5	6	7	8	9	10	11
Bone	**Side**							
Clavicle	left	-	-	P	-	(P)	-	-
	right	-	P	P	-	(P)	-	P
- Sternal epiphysis	left	-	-	-	-	-	-	-
	right	-	-	-	-	-	-	-
Scapula	left	P	P	P	P	-	P	P
	right	P	P	-	-	-	P	P
- Acromion	left	-	-	-	-	-	-	-
	right	-	-	-	-	-	-	-
- Coracoid	left	-	-	-	-	-	P	PN
	right	-	-	-	-	-	P	PN
Patella	left	-	-	-	-	-	P	P
	right	-	-	-	-	-	P	P
Sacrum	NA	-	-	-	-	-	P	P
- Segments 1-2	NA	-	-	-	-	-	P	P
- Segments 2-3	NA	-	-	-	-	-	-	-
- Segments 3-4	NA	-	-	-	-	-	-	-
- Segments 4-5	NA	-	-	-	-	-	-	-
Ilium	left	PN	PN	PN	PN	PF	PN	PN
	right	PN	PN	PN	PN	-	PN	PN
- Iliac Crest	left	-	-	-	-	-	-	-
	right	-	-	-	-	-	-	-
Iscium								
	left	PN	PN	PN	PN	PF	PN	PN
-Ischial tuberosity	right	PN	PN	PN	PN	-	PN	PN
	left	-	-	-	-	-	-	-
Pubis	right	-	-	-	-	-	-	-
	left	-	PN	PN	-	-	PN	PN
Sternum- manubrium	right	-	PN	PN	PN	PF	PN	PN
Sternum - body	NA	-	-	-	-	-	-	-
Humerus	NA	-	-	-	-	-	-	-
	left	P	P	-	P	P(F)	P	P
- Head	right	P	P	P	P	P(F)	P	P
	left	-	-	-	-	-	-	-
- Distal	right	-	-	-	-	PN	PN	PN
	left	-	-	-	-	P(F)	PN	PN
- Medial epicondyle	right	-	-	-	-	P(F)	P(F)	PN
	left	-	-	-	-	P(F)	-	-
Radius	right	-	-	-	-	P(F)	-	-
	left	-	P	-	-	P	P	P
- Head	right	P	-	P	-	P	P	P
	left	-	-	-	-	P(F)	PN	PN
- Distal	right	-	-	-	-	P(F)	PN	-
	left	-	-	-	-	P(F)	-	-
Ulna	right	-	-	-	-	P(F)	PN	-
	left	P	P	-	-	P	P	P
- Head	right	P	P	P	-	P	P	P
	left	-	-	-	-	P(F)	-	-
- Distal	right	-	-	-	-	P(F)	PN	-
	left	-	-	-	-	P(F)	-	-
Femur	right	-	-	-	-	P(F)	-	-
	left	P	P	P	P	P	P	P
-Head	right	P	P	P	P	-	P	P

Table 3: Bone Inventory of Sub-Adult Individuals

Individual:		5	6	7	8	9	10	11
	left	-	-	-	-	P	PN	PN
-Greater Trochanter	right	-	-	-	-	-	PN	PN
	left	-	-	-	-	-	PN	PN
-Lesser Trochanter	right	-	-	-	-	-	PN	PN
	left	-	-	-	-	-	PN	PN
-Distal	right	-	-	-	-	-	PN	PN
	left	-	PN	-	-	-	PN	PN
Tibia	right	-	PN	-	-	-	PN	PN
	left	-	P	P	-	-	P	P
- Proximal	right	-	-	-	-	-	P	P
	left	-	-	-	-	-	PN	PN
- Distal	right	-	-	-	-	-	-	PN
	left	-	-	-	-	-	-	PN
Fibula	right	-	-	-	-	-	-	PN
	left	-	-	P	-	-	P	P
- Proximal	right	-	P	-	-	-	P	P
	left	-	-	-	-	-	-	-
- Distal	right	-	-	-	-	-	-	-
	left	-	-	-	-	-	-	PN
Vertebrae - Cervical	right	-	-	-	-	-	-	PN
Vertebrae - Thoracic	NA	-	-	-	-	-	-	-
Vertebrae - Lumbar	NA	-	-	-	-	-	T12	T8-T12
Mandible	NA	-	-	-	-	-	L1-L5	L1-L5
	NA	(P)	P	P	(P)	(P)	(P)	(P)

Pathological Conditions:

Several pathological conditions were found on the adult skeletons, though none could be clearly related to a cause of death. The skeleton of individual 3 exhibits numerous pathological conditions, yet he lived to a very old age. In contrast, the skeletons of the sub-adults show no or minor pathological conditions, yet they did not survive into adulthood. Paleopathological bone changes show chronicity and the late or serious stages of a disease The body adapted and reacted to the pathology by releasing extra osteoblasts or osteoclasts. As stated by Roberts and Manchester (1998:4), "The absence of paleopathological evidence, does not mean evidence of absence, in all cases." An individual may have been seriously ill, and died before their skeleton had time to react.

Osteophytosis was found on nearly all of the adult skeletons in varying degrees. This degenerative disease is non-inflammatory, chronic and progressive. It is uncommon under the age of 30 at which time it begins to progress with age. By age 75 there is usually 80 - 90% osteophytosis involvement of the spine (Aufderheide 1998).

During vertebral osteophytosis, the intervertebral disk degenerates and allows closer approximation, and eventual contact between the vertebrae. Marginal osteophytes are stimulated by the periosteum, which becomes irritated by this contact (Aufderheide 1998) (Figures 4). If irritated enough, the osteophytes can grow large enough that they cause osseous ankylosis (fusion of vertebrae) (Figure 5). Individual 1 had only slight lipping on the vertebral bodies of the lumbar vertebrae, indicating the beginning of the disease. The

lumbar and thoracic vertebrae of individual 2 exhibit very strong marginal lipping and spurs on the vertebral bodies. The promontory of the sacrum also exhibits strong lipping and spur growth. The sacrum, the lumbar and thoracic vertebrae of individual 3 all exhibit marginal lipping. The cervical vertebrae exhibit extensive reaction to vertebral disk hernia, as vertebral body compression and deformation have taken place. Osseous ankylosis (vertebral fusion) has taken place between C2 and C3, as well as between C5 and C6. This would have resulted in an abnormal forward curvature of the upper cervical spine in individual 3.

Osteophytic lipping is not limited to the vertebral column and can also be seen on other postcranial elements. The greater trochanter of the left femur of individual 1 shows osteophytic lipping (Figure 6). This area is used for muscle attachment and lipping here may be indicative of alteration caused by arthritis or activity. Individuals 10 and 11 appeared to exhibit slight lipping of the apex of the auricular surface on the os coxae that was beyond normal. Osteophytic lipping could also be seen on the proximal head of two unattributed first right metatarsals, due to degenerative joint disease of the foot.

Out of numerous rib fragments, only one rib exhibited abnormal pathology. The articular surface exhibits osteophytic growth where articulation with the thoracic vertebrae would occur. The corresponding vertebrae could not be found, and this is likely due to the extensive postmortem fragmentation of the bones (Figure 7).

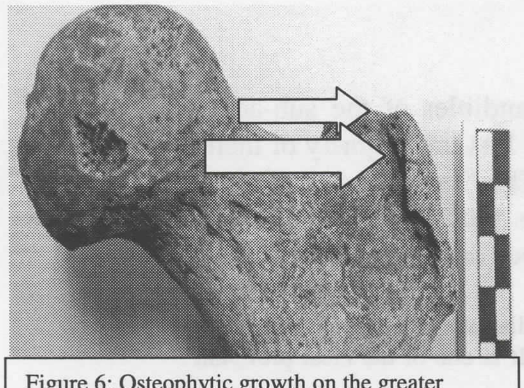
Figure 6: Osteophytic growth on the greater trochanter of the left femur, individual 1, anterior view.

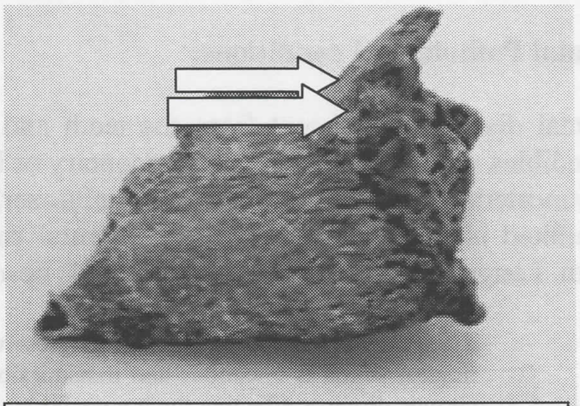
Figure 7: Excessive bony growth on a rib, sternal end.

There are different speculated etiologies for the disease that range from micro-trauma, to defective blood flow (emboli) to it simply being idiopathic. The disease usually affects children aged 10 - 25, and though uncommon to be found after the fourth decade of life, some recent modern cases in middle-aged women have been reported (Murray et al. 1990). The presence of osteochondroses dessecans in early age has been shown to accelerate the onset of degenerative joint disease, and thus may explain why this individual has such a high amount of vertebral osteophytosis at middle age.

Periostitis (inflammation of the periosteum) is a reaction to infection, which results in bone remodeling. Canals to ooze infectious pus appear in the inflamed bone. The greater

trochanter of individual 3 shows a minor case of periostitis, as does the left humeral shaft near the deltoid tuberosity, of individual 9. In these cases the periostitis was likely caused by some non-specific infection that likely was mainly muscle tissue related .

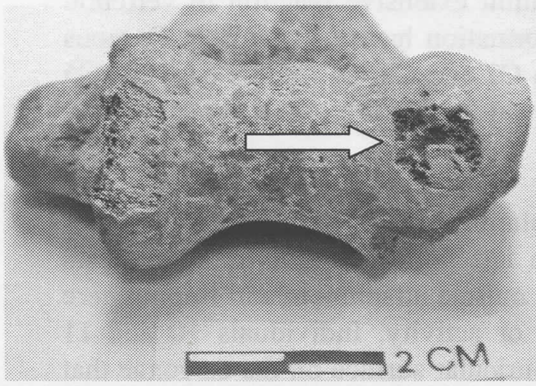

Figure 8: Osteochondroses dessecans of the capitulum, left humerus, distal view, individual 2.

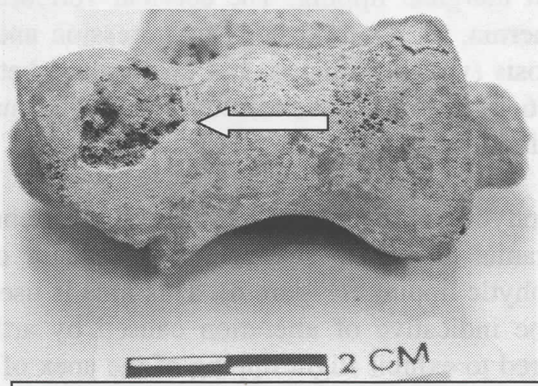

Figure 9: Osteochondroses dessecans of the capitulum, right humerus, distal view, individual 2.

Only two other post cranial pathological conditions were exhibited on the skeletons. A lytic lesion was found on the proximal end of a left first metacarpal, with unknown origins, and lastly, two ribs with irregular surface texture alongside the interior angle face were found. This slightly bumpy surface on the ribs is caused by pulmonary infection, which does not appear to have bee too severe in this case.

Dental Pathological conditions:

Dental disease was absent from the teeth and mandibles of the sub-adults. The adult mandibles were almost entirely fragmentary or had lost the majority of their teeth through postmortem changes (i.e. excavation, bulldozer). The 'loose' and unattributed adult teeth exhibited high wear patterns, though dental caries was only seen on 6 of the 82 loose teeth. Langsjoen (Aufderheide 1998:402-4) describes dental caries as:

> a multifactorial, multibacterial, progressive disease of the calcified teeth tissues, which is infectious and transmissible. It is one of the most prevalent chronic diseases affecting the human body.

High calcus deposits were only seen on two of the loose teeth, and were always associated with caries on the same tooth. The only adult mandible that could conclusively be attributed to an individual, belonged to individual 3 and exhibited several pathological conditions (Figure 10). Though this mandible had had the highest incidence of dental disease, it must be reiterated that it belonged to the oldest of the eleven individuals.

Osteomyelitis (infection) in the form of a dental abscess can be seen on the left anterior portion of the mandible below what appears to have been the second premolar (20)[1]. The second premolar (20) suffered from crown caries leaving only the root and the shell of the crown.

[1] Dental Annotation is done under the international coding system as described by Langsjoen (Aufderheide 1998:395).

The right canine (27) shows two linear horizontal grooves of reduced enamel thickness on the facial aspect of the tooth, indicating enamel hypoplasia. Enamel hypoplasia refers to an enamel defect that results from a period of body-wide, metabolic stress (e.g. poor nutrition, presence of infectious diseases or trauma at some point during life) (Aufderheide 1998).

The third molar (17) exhibits some calcus deposition along the alveolar margin, but none more than would be expected for this population. The only teeth that appear to have been present ante mortem, include: 27, 26, 25, 24, 23, 22, 20 and 17. All of these have been lost postmortem except for 27, 20 and 17. The alveolar portion of the bone has remodeled itself for all missing ante mortem teeth. The reabsorption of the alveolar portion of the mandible, in association with the high dental attrition (score 37 using the Scott system; Scott [1979]) on the third molar (17), corroborate the elderly age estimate made from the os coxae.

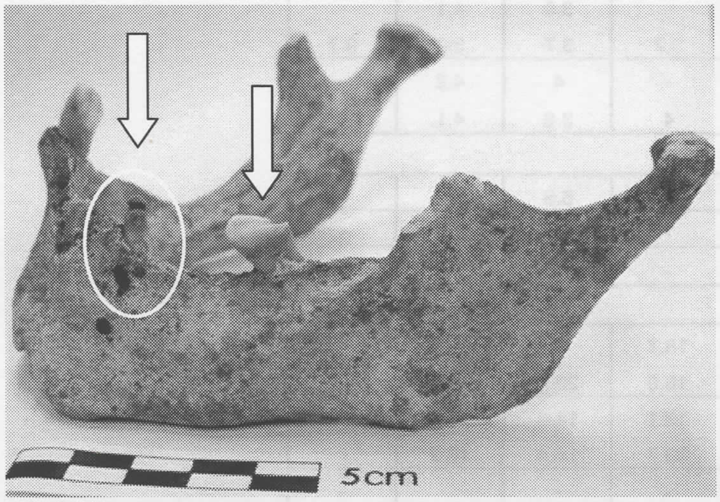

Figure 10: Mandible associated with individual 3. Note the dental abscess, dental wear and absorbtion of the alveolar portion of the mandible.

Congenital Traits and Congenital pathological conditions:

A congenital trait found is the presence of a third trochanter on the right femur, and the beginnings of a third trochanter on the left femur just below the hip joint, near the attachment for the gluteal muscle of individual 3. In some groups it is more common in men, and may be related to robusticity. In this case, the individual is both male and very robust.

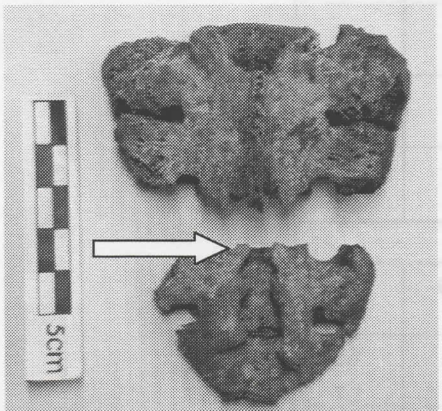

Figure 11: Spina bifida occulta.

Spina bifida occulta, the incomplete fusion of the posterior neural arch is also evident in the sacra of individuals 2 and 7. It is the most common spinal congenital defect and is not fatal in this form (Aufderheide 1998). The neural arch of sacral bodies 3 through 5 has not fused (Figure 11).

Lastly, symphalangism was discovered in two separate digits (Figure 12). Symphalangism is an inherited (dominant) congenital anomaly. It results in the fusion of two phalanges within the same digit (Aufderheide 1998). Two cases of it were found in the distal interphalangeal joint of the foot, which is a common location. Because the remains were

Table 4: Measurement of Individual Bones- Adults (cm)*

		Individual			
Bone	**Side**	**1**	**2**	**3**	**4**
Clavicle	left	12.8	-	14.8	-
	right	11.9	-	14.7	-
Scapula	left	-	-	-	-
	right	-	-	-	-
Patella:					
-Height	left		3.9	4.1	-
	right	3.7	3.7	3.9	3.7
-Width	left	-	4	4.2	-
	right	4	3.8	4.1	4
Sacrum:					
-Promontory width	NA	-	6.6	6.2	-
-Height	NA	-	12.5	-	-
-Width	NA	-	11.3	-	-
Innominate:					
-Height (iliac crest-iliac tuberosity)	left	18.7	-	22.9	-
	right	18.6	20.5	23.5	-
-Iliac Breadth	left	13.1	14.6	17	-
	right	13.7	14.4	16.2	-
-Pubis length	left	-	-	-	-
	right	-	7	10.8	-
-Ischium length	left	-	9.1	9.9	-
	right	-	8	8.7	-
Sternum – manubrium	NA	4.8	-	-	-
- body	NA	7.8	-	-	-
Humerus:					
-Maximum length	left	-	-	-	-
	right	-	32	-	-
-Anterior-posterior diameter	left	1.6	2	-	-
	right	1.7	2	-	2.4
-Medial-lateral diameter	left	1.5	1.5	-	-
	right	1.6	1.6	-	1.9
-Maximum head diameter	left	-	4	-	-
	right	-	4.1	-	4.4
Radius:					
- Maximum length	left	-	-	26.9	-
	right	-	-	-	-
-Med-Lat diameter at midshaft	left	1.2	1.3	1.7	1.6
	right	-	1.4	1.8	1.7
-Ant-Post diameter at midshaft	left	1	0.8	1.4	1.5
	right	-	0.9	1.4	1.5
Ulna:					
-Maximum length	left	24.8	-	-	-
	right	-	25.3	-	-

Table 4 cont.

-Physiological length	left	22.2			-
	right	-	22.5	-	-
-Least circumference shaft	left	3.7		-	4.1
	right	-	3.5	-	4
-Anterior-Posterior diameter	left	1.3	1.4	1.5	1.4
	right	-	1.6	1.7	-
-Medial-Lateral diameter	left	1.1	1.1	1.7	1.3
	right	-	1.2	1.7	-
Femur:					
-Maximum length	left	40	44.6	49.2	-
	right	39.9	44.4	49.3	-
-Bicondylar length	left	39.7	44.3	48.9	-
	right	39.5	44	49	-
-Anterior-Posterior diameter	left	3	2.9	3.4	-
	right	2.5	2.9	3.3	-
-Medial-lateral diameter	left	2.2	2.1	2.8	-
	right	2.2	2.2	2.6	-
-Midshaft circumference	left	7.8	8.2	9.8	-
	right	7.6	8	9.4	-
-Maximum head diameter	left	4	4.3	4.9	4.8
	right	4.1	4.3	5	-
-Subtrochanter A-P diameter	left	2.1	2.2	2.9	-
	right	2.2	2.2	2.9	-
-Subtrochanter M-L diameter	left	2.9	3.1	3.1	-
	right	2.9	3.2	3.6	-
Tibia:					
-Maximum length	left	-			-
	right	-	-	37	-
-Max. diameter at nutrient foramen	left	-	-	-	-
	right	-	3.3	-	-
-Med-Lat diameter at nutrient foramen	left	-	-	-	-
	right	-	1.9	-	-
-Max. proximal epiphyseal breadth	left	-	7.5	-	-
	right	-	7.2	8.1	-
-Maximum distal epiphyseal breadth	left	-	-	-	-
	right	-	3.9	-	-
Fibula:					
-Maximum length	left	-	35.7	-	-
	right	-	35.9	-	-
-Maximum diameter at midshaft	left	-	1.6	-	-
	right	-	1.6	-	-

* Does not include any cranial measurements.

P = Present

- = Absent or immeasurable

Table 5: Measurement of Individual Bones- Sub adults (cm)

		Individual						
Bone	**Side**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
Clavicle	left	-	-	7.5	-	-	-	-
	right	-	6.1	7.4	-			
Scapula	left	-	-	-	-	-	-	-
	right	-	-	-	-	-	-	
Patella - Height	left	-	-	-	-	-	3.5	-
	right	-	-	-	-	-	3.5	3.8
- Width	left	-	-	-	-	-	3.4	-
	right	-	-	-	-	-	3.1	-
Sacrum:								
- Promontory width	NA	-	-	-	-	-	4.7	4.4
Ilium - Ant/Sup-Post/Sup spine	left	-	6.5	-	-	*	-	-
	right	-	-	-	5.1	*	-	12.4
Iscium - length	left	2.8	4	-	2.8	*	6.9	6.6
	right	-	4	4	-	*	6.9	-
Pubis - length	left	-	3.2	3.9	-	*	6.1	-
	right	-	3.1	-	2.3	*	6.1	-
Sternum - manubrium	NA	-	-	-	-	-	-	-
- body	NA	-	-	-	-	-	-	-
Humerus:								
-Maximum length	left	-	13.1	-	-	30*	-	-
	right		13	-	-	-	26.8	-
-Distal extremity diameter	left	3.1	-	-	-	5.2	4.2	4.1
	right	-	-	3	-	4.9	4.1	4.1
-Midshaft diameter	left	0.9	1.3	1.5	1	2.2*	1.4	1.3
	right	0.9	1.2	1.5	1	-	1.4	1.4
-Max. epiphysis head diameter	left	-	-	-	-	-	3.9	4
	right	-	-	-	-	-	3.5	3.9
Radius:								
- Maximum length	left	-	10.3	-	-	25*	-	19.5
	right	-	-	13.1	-	25.4*	20.5	-
- Midshaft diameter	left	-	0.8	-	-	1.4	-	1.2
	right	0.7	-	0.9	-	1.5	1.2	1.1
Ulna:								
-Maximum length	left	-		-	-	27.9*	-	-
	right	8.5	-	14.1	-	26.9*	22.4	-
- Midshaft diameter	left	0.6	0.9	1.3	-	1.4		1.1
	right	0.6	0.8	1	-	1.5	1.4	1.2
Femur:								
-Maximum length	left	12.6	18	-	(12)	-	36.8	37.1
	right	12.4	17.6	(23)	-	-	36.1	36.5
-Bicondylar length	left	12.5	17.8	-	-	-	36.4	36.7
	right	12.4	17.7	-	-	-	36.1	36.2

Table 5: Measurement of Individual Bones- Sub adults (cm)

		Individual						
-Anterior-Posterior diameter	left	0.9	1.3	1.4	0.9	3.1	2.2	2.3
	right	0.9	1.5	1.5	1.1	-	2.2	2.2
-Medial-lateral diameter	left	1	1.3	1.5	1	2.7	2	2.1
	right	1	1.3	1.5	0.9	-	1.9	2.1
-Midshaft circumference	left	3.2	4.5	4.8	3.2	9.1	6.8	7
	right	3.2	4.5	4.8	3.2	-	6.5	6.8
-Maximum head diameter	left	-	-	-	-	-	3.8	4.1
	right	-	-	-	-	-	3.6	3.9
-Subtrochanter A-P diameter	left	1	1.5	1.6	1	2.9	2	2.1
	right	1	1.5	1.5	1.1	-	1.9	2
-Subtrochanter M-L diameter	left	1.1	1.6	1.9	1.1	3.4	2.4	2.9
	right	1	1.6	1.9	1.2	-	2.4	2.8
Tibia:								
-Maximum length	left	-	14.5	19	-	-	-	35.7
	right	-	-	-	-	-	28.8	35.9
-Midshaft diameter	left	-	1.3	1.4	-	-	2.6	2.6
	right	-	-	-	-	-	2.6	2.5
Fibula:								
-Maximum length	left	-	-	-	-	-	-	29.8
	right	-	-	-	-	-	-	-
-Midshaft diameter	left	-	-	0.9	-	-	1	1.1
	right	-	0.6	-	-	-	1	1.1

Measurements are of diaphysis lengths unless otherwise noted. * Length of diaphysis with fused epiphysis (x) = approximate measurement as broken. P = Present - = absent or immeasurable.

commingled, it is difficult to tell whether the digits belong to the same individual, or if two individuals are represented. Symphalangism in multiple individuals could be a measure of genetic relatedness.

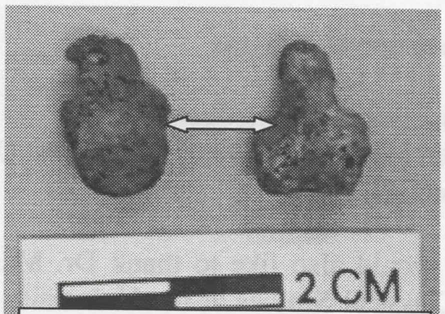

Figure 12: Symphalangism.

Summary

Osteological analysis of the mass grave from Horseshoe Valley Road provides archaeologists and scholars with valuable information about the lives of prehistoric Hurons. Though the ossuary contained only a small number of individuals, their ages spanned a wide range from young infancy to old adulthood. This range is extremely important because it provides valuable information, which can act as a useful demographic sample, which hopefully is representative of the whole population.

In concordance with local band council and the Ministry of Tourism, Culture and Recreation - Cemeteries Branch, the remains were reburied and further study of this sample is not feasible.

Table 6: Summary of Sex, Age, Stature and Pathological Conditions by Individual.

Individual	Age	Aging Method	Sex	Sexing Method	Stature (cm) (±3.80)	Pathological Conditions	Genetic Condition
1	40-49 y	a,b	F	a,c	145.69	Vertebral osteophytosis Osteophytic lipping, femur	-
2	30-34 y	b	M	b,c	168.25	Vertebral osteophytes Osteochondroses dessecans Spina bifida occulta	-
3	45-60 y	a,b	M	a,b,c	178.57	Vertebral osteophytosis Osseous ankylosis Sacro-Iliac fusion Periostitis-femur Dental abscess Enamel hypoplasia Calcus deposition	Third trochanter
4	30-34 y	b	M	a	(178.57)	-	-
5	6-9 m	c,d,e	-	-	-	-	-
6	24-30 m	c,d,e	-	-	-	-	-
7	4-5 y	c,d,e	-	-	-	(Spina bifida occulta)	-
8	3-6 m	c,d,e	-	-	-	-	-
9	18-20 y	a,b,e	-	-	-	Periostitis-humerus	-
10	11-12 y	c,e	-	-	-	Slight lipping on apex of auricular surface	-
11	11-12 y	c,e	-	-	-	Slight lipping on apex of auricular surface	-

Aging Techniques:
a-Pubic Symphysis (Todd (1921) and Suchey Brooks (1990))
b-Auricular Surface (Lovejoy et al. (1985))
c-Diaphyseal Measurements (Buikstra et al. (1994))
d-Dental Development (Ubelaker (1989)) e-Epiphyseal Union

Sexing Techniques:
a-Non-Metric Innominate Bone Analysis
b-Non-Metric Cranial Bone Analysis
c-Robusticity and Long Bone Measurements

Stature: Based on the formula for Mongoloids developed by Trotter and Gleiser (1970) and modified by Byers (2002).

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